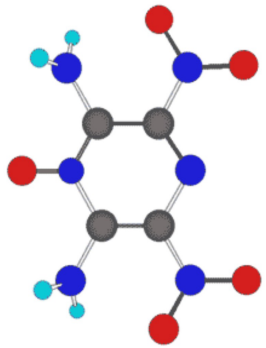
Emerging Contaminants
- The New Frontier -

What is an Emerging Contaminant?

- **Chemicals & materials with:**
  - Perceived or real threat to human health or environment
  - Either no peer reviewed health standard or an evolving standard

- **May have:**
  - Insufficient human health data/science
  - New detection limits
  - New exposure pathways



National & International Interest

- **USGS Survey of 139 streams in 30 states**
  - **Contaminants found in 80% of streams**
    - **Hormones, steroids, antibiotics**
    - **Insecticides**
    - **Prescription & non-prescription drugs**
    - **Plasticizers & fire retardants**
    - **Detergent metabolites**
    - **Solvents & disinfectants**

- **Renewable Nat'l Resources Foundation Report**
- **European Union – REACH**
  - **Unless pre-registered, chemicals can't be sold**
  - **Tox data must be submitted to European Chemicals Agency**
  - **If toxic, mutagenic, or carcinogenic, more data required**

How Can ECs Affect DoD?

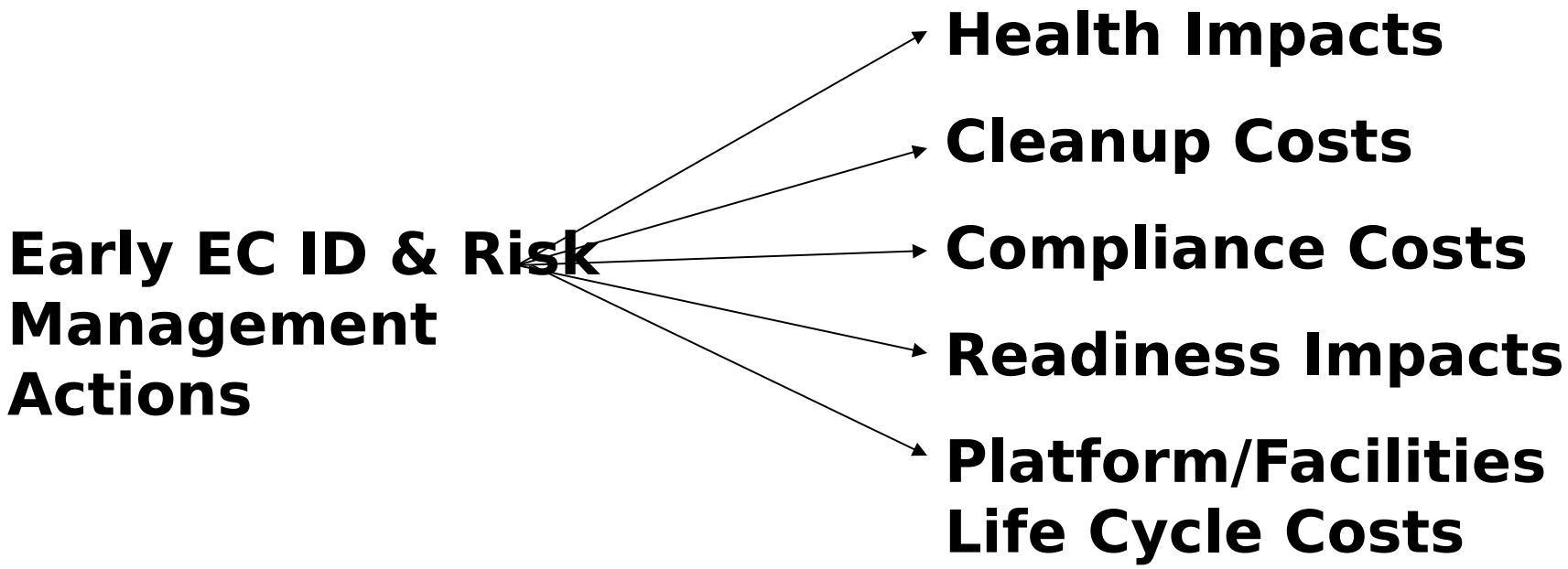
- **Adverse health effects on operating forces, DoD employees, and/or public**
  - Human health protection paramount
- **Reduced training/readiness**
  - Restrictions on use of ranges
- **Restricted or non-availability of material**
  - Adverse impact on mission-critical applications & industrial base
- **Increased O&M and/or cleanup costs**
  - Resource drain from mission needs

Examples – Past & Present

- **Ozone Depleting Substances –** Refrigerants, fire suppressants, solvents…phased out of production!
- **Perchlorate -** Munitions/propellant oxidizer…very low toxicity levels being set by states (2 ppb in MA)
- **Hexavalent Chromium -** Heavy metal used in DoD systems/platforms…recent, revised 10-fold reduction in acceptable exposure level
- **PBDEs -** Fire retardants…EU banned in July 06….states following with legislation
- **Naphthalene -** Component of JP-8/fuels used throughout DoD…proposed as a carcinogen by EPA… low toxicity levels could have major impacts

The Need for Action

Proactive vice Reactive



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Small Investment

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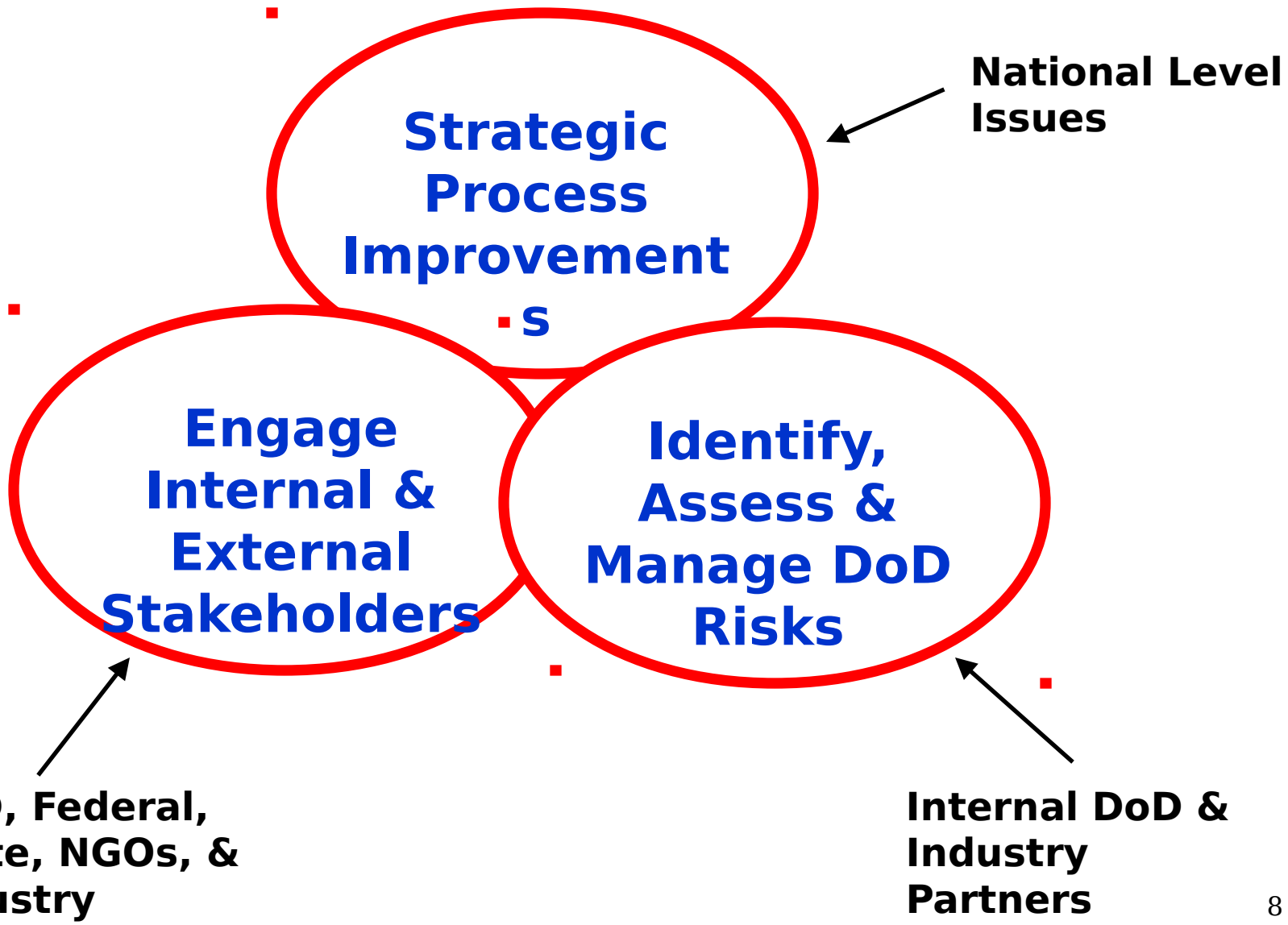
Large Benefits

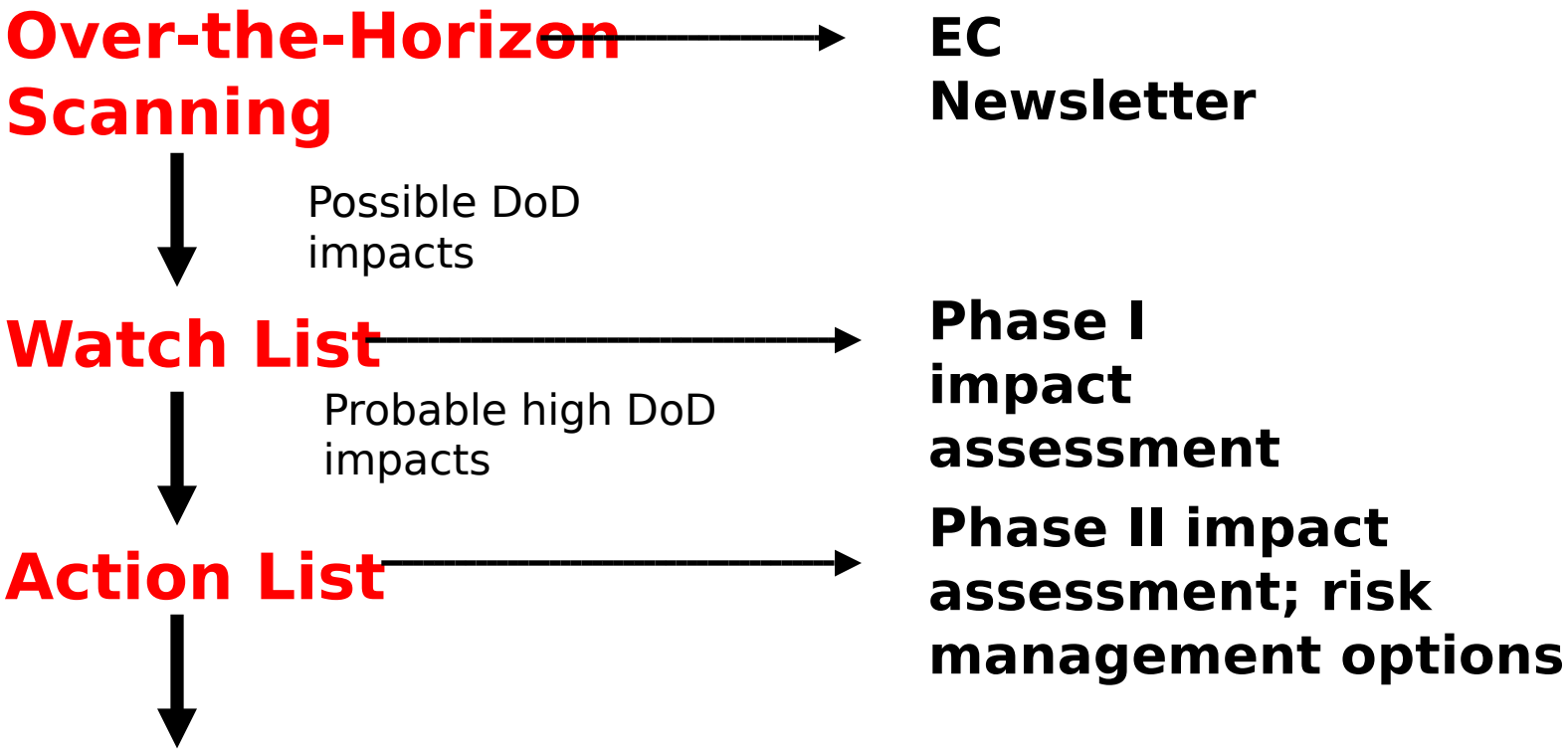
Imagine
if the largest industrial complex in the nation could…

- *Predict* which chemicals it used or might use pose human health and environmental risks and have a changed regulatory status.
- *Develop* a consensus evaluation of types & magnitudes of the risks in using/releasing the chemical.
- *Develop* risk management options and invest in high-payback actions.
- *Achieve* and *measure* risk reduction.

EC Directorate Strategic Priorities


Strategic Process Improvements
National Level Issues
Engage Internal & External Stakeholders
Identify, Assess & Manage DoD Risks
DoD, Federal, State, NGOs, & Industry
Internal DoD & Industry Partners

EC Tracking Process



Phase I EC Impact Assessment

1. Probability of Regulation/Re-regulation

2. Impact on DoD Functional Categories

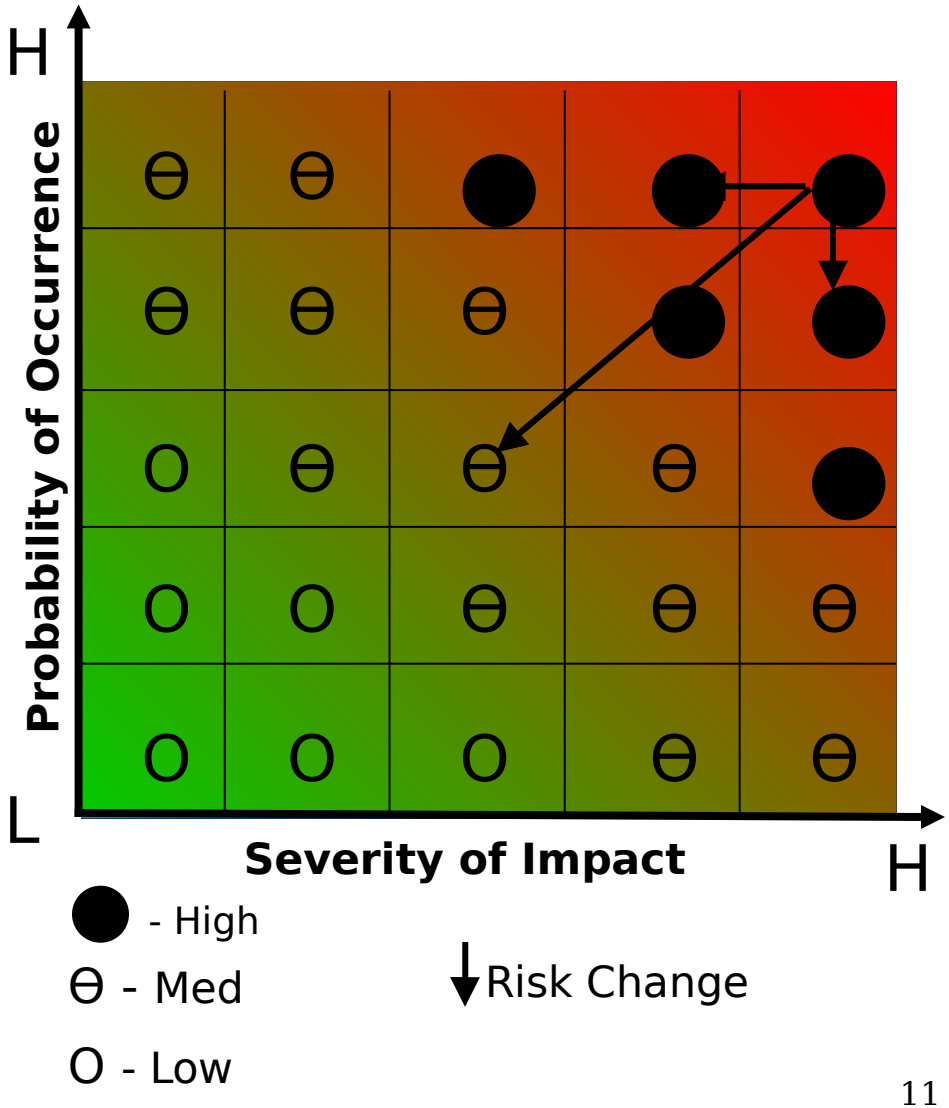
Environment Safety & Health	Readiness & Training	Acquisition	O&M of DoD Assets	Cleanup
H	H	H	H	H
M	M	M	M	M
L	L	L	L	L

Results →

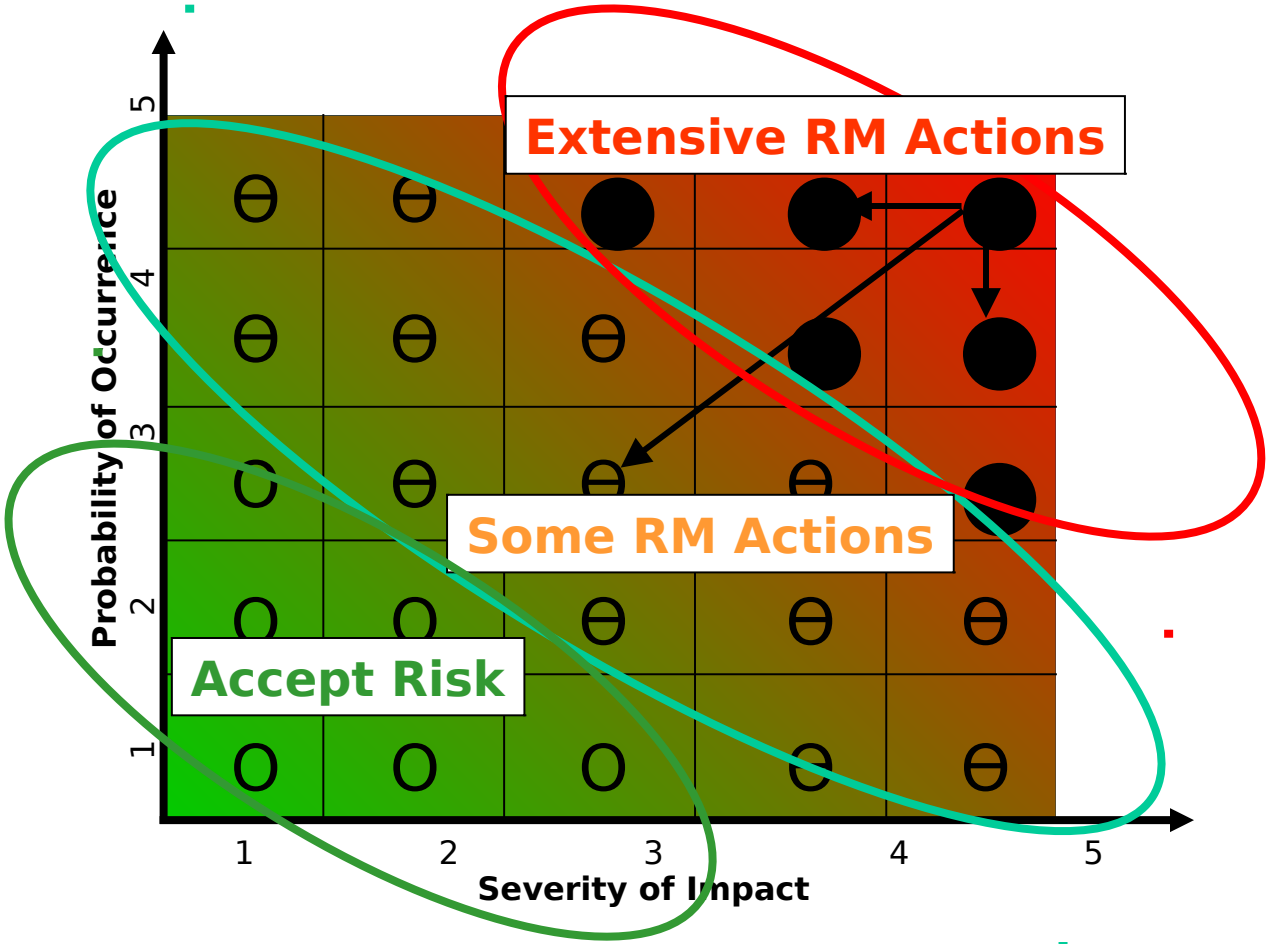
- **Decision – Move to Action List?**
- **Initial Risk Management**

Plotting EC Risk to DoD

- High risk at top right
- Risk management actions move ECs to lower left…lower risk
- Seek to quantify risk reduction



Integrated Risk Management



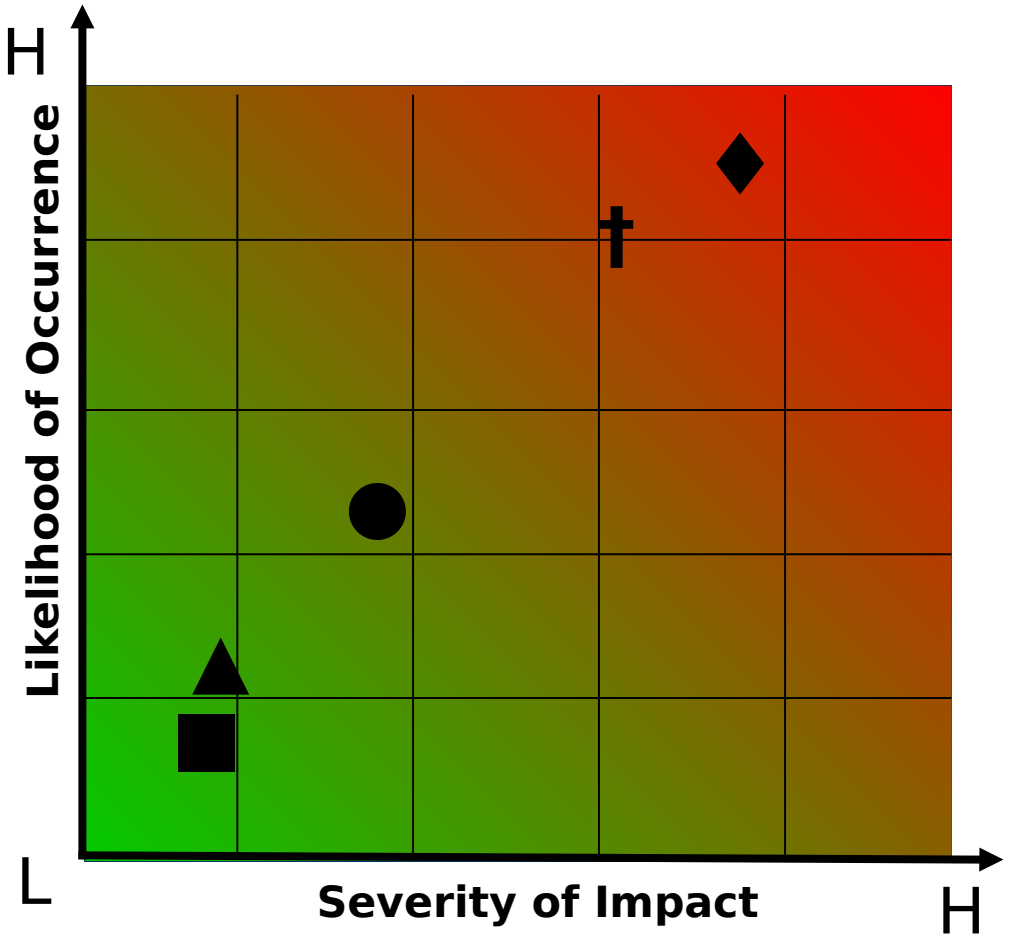
RM Options

- Fill tox science gaps
- RDT&E
- Material substitution
- Process changes
- Regulatory engagement
- Stockpile material
- Exposure assessment monitoring
- Personal Protective Equipment (PPE)
- Acquisition changes
- Benchmark with industry
- Risk communication
- Training

TCE Phase 1 Impact Assessment

Completed October 2006

- ♦ ES&H
- ■ Readiness & Training
- ▲ Acquisition/RDT&E
- ● O&M of Assets
- † Cleanup



EC Watch List

- Tungsten & alloys
- Tetrachloroethylene
- Dioxin
- N-nitrosodimethylamine (NDMA)
- 1,4-dioxane
- 1,2,3-trichloropropane (TCP)
- Nanomaterials
- Perfluorooctanoic acid (PFOA)
- Dichlorobenzenes
- Beryllium
- Polybrominated biphenyl ethers (PBDEs)
- Di-nitrotoluenes (DNT)
- Naphthalene
- Lead

Recently added

Notes: - Impact assessments underway for all ECs except nanomaterials.

EC Action List

- **Perchlorate**
- **Royal Demolition eXplosive (RDX)**
  - **Cyclotrimethylenetrinitramine**
- **Trichloroethene (TCE)**
- **Hexavalent Chromium**
- **Naphthalene**

Recently elevated from Watch List

Notes: - Some risk management actions underway including research on toxicity, substitutes, & treatment.

Perchlorate Risk Management Actions

- **DoD & EPA synchronized policies**
  - Requires sampling in various media
  - Sets a “level of concern” based on NRC peer review
- **California Site Prioritization Protocol**
  - Joint DoD-State initiative to cull & prioritize sites for sampling & risk management
- **Army-Hughes Perchlorate Substitution Studies**
- **SERDP/ESTCP Treatment Studies**
  - **Drinking water, wastewater, contaminated sites**

EC Issues

- **What is the appropriate use of non-peer reviewed risk data/studies?**
- **What criteria or conditions would trigger actions requiring expenditures for ECs with no established risk level?**
  - **How would we determine a threat to public health?**
  - **What justification do we use for expenditures not in the budget?**
- **How should EC risks be communicated?**

EC Research Needs

- **Toxicology & Risk Assessments**
  - Identify science gaps & conduct toxicity studies
- **Material Substitutions**
  - Green Chemistry considerations…use less toxic chemicals where possible
  - Life-cycle cost analyses in acquisition
- **Treatment for releases**
  - Air, drinking water, wastewater, and contaminated sites

Summary

- **EC management requires new thinking**
  - Proactive vice reactive
  - Make targeted investments before regulatory action
  - Base decisions on life cycle costs
- **Efficient process being established for tracking, assessing and developing risk management options**
  - Leverages existing assets/resources
- **Potential large payback**
  - Protects people, mission and assets